AMENDMENTS TO THE CLAIMS

For the Examiner's convenience, all pending claims are set forth below and have been amended where noted:

1. (Currently Amended) A toughened material comprising:

a polycrystalline diamond material with a crystalline structure selected from the group consisting of: a natural diamond, a synthetic diamond, ~~a polycrystalline diamond,~~ and mixtures thereof, wherein the polycrystalline diamond material is integrated with a second material selected from the group consisting of: an iron, an iron alloy, a copper, a copper alloy, a carbide, a ceramet, and combinations thereof;

wherein the ~~diamond~~ second material [[is]] comprises a substantially continuous matrix in which granules of the polycrystalline diamond material are dispersed, and wherein ~~comprising a~~ the second material has ~~having~~ a degree of ductility that is greater than that of the granules of the polycrystalline diamond material dispersed within the substantially continuous matrix; and

~~wherein the diamond material has a material temperature; and~~

wherein the toughened material is formed by a process comprising the steps:

i. placing the polycrystalline diamond material having a material temperature into a chamber of a thermal control apparatus, wherein the chamber has a chamber temperature;

ii. introducing a first cryogenic material into the thermal control apparatus;

iii. decreasing the material temperature of the polycrystalline diamond material in the chamber with the first cryogenic material while preventing over-stressing of the polycrystalline diamond material, to a first target temperature ranging from -40 degrees F to -380 degrees F at a first

temperature rate ranging from 0.25 degrees per minute to 20 degrees per minute;

iv. stopping the introduction of the first cryogenic material into the chamber once the first target temperature is reached;

v. increasing the chamber temperature to a second target temperature ranging from 0 degrees F to 1400 degrees F; and

vi. increasing the material temperature to the second target temperature at a second temperature rate ranging from 0.25 degrees per minute to 20 degrees per minute, wherein the second temperature rate is controlled by increasing the chamber temperature;

vii. introducing a second cryogenic material into the thermal control apparatus to decrease the material temperature while preventing over-stressing of the polycrystalline diamond material, to a third target temperature ranging from -40 degrees F to -380 degrees F at a third temperature rate ranging from 0.25 degrees per minute to 20 degrees per minute;

viii. stopping the introduction of the second cryogenic material into the chamber once the third target temperature is reached;

ix. increasing the chamber temperature to a fourth target temperature from 0 degrees F to 1400 degrees F; and

x. increasing the material temperature to the fourth target temperature at a fourth temperature rate ranging from 0.25 degrees per minute to 20 degrees per minute, wherein the fourth temperature rate is controlled by increasing the chamber temperature, resulting in a toughened diamond material.

2. (Cancelled)

3. (Currently Amended) The toughened material of claim 1, wherein the polycrystalline diamond material is treated using the first temperature rate substantially the same as the second temperature rate.

4. (Currently Amended) The toughened material of claim 1, wherein the polycrystalline diamond material is treated further using the steps of:

   a. introducing a third cryogenic material into the thermal control apparatus to decrease the material temperature and while preventing over-stressing of the polycrystalline diamond material, to a fifth target temperature ranging from -40 degrees F to -380 degrees F at a fifth temperature rate ranging from 0.25 degrees per minute to 20 degrees per minute;

   b. stopping the introduction of the third cryogenic material into the chamber once the fifth target temperature is reached;

   c. increasing the chamber temperature to a sixth target temperature from 0 degrees F to 1400 degrees F; and

   d. increasing the ~~diamond~~ material temperature to the sixth target temperature at a sixth temperature rate ranging from 0.25 degrees per minute to 20 degrees per minute, wherein the sixth temperature rate is controlled by increasing the chamber temperature, resulting in the toughened diamond material.

5. (Currently Amended) The toughened material of claim 1, further comprising the step of permitting the polycrystalline diamond material to soak at the first target temperature for a first period of time.

6. (Original) The toughened material of claim 5, wherein the first period of time ranges from 15 minutes to 96 hours.

7. (Currently Amended) The toughened material of claim 1, further comprising the step of permitting the polycrystalline diamond material to soak at the second target temperature for a second period of time.

8. (Original) The toughened material of claim 7, wherein the second period of time ranges from 15 minutes to up to 48 hours.

9. (Previously Amended) The toughened material of claim 1, wherein the thermal control apparatus further comprises a heat exchanger disposed in the chamber to provide a cryogenic vapor to the chamber.

10. (Previously Amended) The toughened material of claim 9, wherein the first cryogenic material, the second cryogenic material, or combinations thereof is released into the heat exchanger thereby absorbing heat from the chamber into the heat exchanger forming the cryogenic vapor that fills the chamber.

11. (Previously Amended) The toughened material of claim 9, wherein the cryogenic vapor is a member of the group consisting of hydrogen, nitrogen, oxygen, helium, argon, and combinations thereof.

12. (Original) The toughened material of claim 1, wherein the first temperature rate and the second temperature rate are determined by the mass of the diamond material.

13. (Currently Amended) The toughened material of claim 1, wherein the third temperature rate and the fourth temperature rate and are determined by the mass of the polycrystalline diamond material.

14. (Currently Amended) The toughened material of claim 4, wherein the fifth temperature rate and the sixth temperature rate and are determined by the mass of the polycrystalline diamond material.

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Original) The toughened material of claim 1, wherein the polycrystalline diamond is a coating.

21. (Currently Amended) The toughened material of claim 1, wherein the polycrystalline diamond material is a heat treated material.

22. (Currently Amended) The toughened material of claim 21, wherein the heat treated material is a polycrystalline diamond material that has been heated to a temperature of at least 180 degrees F and cooled.

Applicant believes that no new matter has been added through these amendments.